WRITTEN REPLY

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1. Identification of the International Application

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5. Contents of Reply Attached thereto

1. We have been informed of your opinion that claims 1 to 3, and 10 of the present application lack novelty and nonobviousness in view of the document (1) (proceedings of the 23rd symposium on civil engineering information processing system, No. II-9, July 27, 1998) and that claims 4 to 9 of the present application lack nonobviousness because the configuration described in the document (2) (JACIC information, Vol. 14, No. 2, July 30, 1999) can be easily combined with the configuration described in the document (1). We are, however, convinced that the claims of the present application are novel and nonobvious for the reasons stated in the following.

2. Invention of the present application

The invention provides a system in which sensors (for example, acceleration sensors for detecting earthquake tremors) having a wireless communication function are installed in different locations and in which data can be efficiently collected from the sensors. Namely, the invention according to claim 1 of the present application provides a sensor network system including a sensor chip which can transmit measurements by wireless communication, a sensor database which stores measurements collected by the sensor chip, a sensor information management unit which manages access to the sensor database, a receiver which receives measurements from the sensor chip and accesses the sensor information management unit via a network,

a map database which stores, as map information, data on equipment in which the sensor chip is installed, a map information management unit which manages access to the map data base, and a sensor control device which registers the location where the sensor chip is installed in the map database.

The procedure for installing a sensor chip in equipment (for example, a fire hydrant, pumper connection, or stake) will be described below. First, register information (such as ID) on a sensor in a sensor database (FIG. 3). Next, register equipment information in a map database in the map information management unit and store equipment location data as map information. At a location where fixed equipment (for example, a fire hydrant) in which the sensor chip is to be installed exists, acquire the sensor ID using a mobile telephone, then, by accessing the map database (that also includes map drawing data) and displaying a map of neighborhood area where the equipment exists on the display of the mobile telephone, confirm the equipment. After confirming the equipment, register the sensor ID in the column for the equipment in the map database (line 19 on page 15 to line 22 on page 16, FIGS. 11 and 12). Subsequently, attach the sensor chip to the equipment. With this done, data measured by the sensor chip is constantly transmitted wirelessly from where the equipment is located. The data is stored in the sensor database in the sensor information management unit (FIG. 3). When there is not any fixed equipment like the one described

above in a location where the sensor chip is desired to be installed, confirm, using GPS, data on the location that is displayed on the neighborhood map (shown on the display of the mobile telephone) acquired from the map database, then, at the location, put the stake to which the sensor chip has been attached in the ground. Subsequently, register the location data as stake (equipment) data in the map database, then register the sensor ID in the column for the stake in the database (line 23 on page 16 to line 11 on page 17, FIGS. 13 and 14).

When a user uses the system, he or she first accesses the map database, searches for the target equipment (which may be a stake), and acquires the sensor ID associated with the equipment. The user then accesses the sensor database based on the sensor ID and acquires the data on the sensor stored in the database (line 12 on page 17 to line 25 on page 18, FIGS. 15 and 16).

As described above, the system according to the invention is characterized in that it is provided with "a map database storing, as map information, data on equipment in which a sensor is to be installed" (FIGS. 1 and 4) and that, by linking a sensor attached to equipment to data on the equipment, the location where the sensor is installed is associated with the equipment. These characteristics of the invention solve the problem described as follows: "There may be cases in which the available positioning accuracy is not high enough. In such cases, it

is possible that a position considerably apart from where a sensor chip is installed is managed as a sensor chip position. Correcting such an error is troublesome" (lines 4 to 8 on page 3). Thus, the invention achieves an object that is "providing, without requiring the mechanism of sensor chips to be changed, a means for saving the trouble of mapping sensor information on a map information system" (lines 9 to 12 on page 3).

3. Systems described in the cited documents

A passage in "1. Introduction" (line 25 on page 2 to line 13 page 3) of the document (1) goes "information stakes are managed using a GIS (Geological Information System)." As so said in the passage, the systems described in the documents (1) and (2) are aimed at managing information stakes themselves, and the systems are assumed to be positioning systems such as RTK-GPS systems capable of high-precision surveying.

An information stake is a stake with a built-in contactless IC card. When an information stake is installed, basic information is stored in its built-in contactless IC card by using such a system as RTK-GPS or GIS (Geological Information System). When this is done, a territorial distributed database (a small-scale database in which a portion of information included in a GIS database is recorded) associated with the GIS is generated in the contactless IC card (lines 12 to 13 on page 6 of the document (2)). The effects of using such an

information stake includes: a survey can be started upon acquiring data from an information stake on the spot; the efficiency of work related with land management can be improved by utilizing maps and neighborhood pictures available from a GIS; and backup data is secured even if a GIS database is destroyed at times of disaster ("(3) Image of Operation" in the document (1)).

4. Differences between the scope of claims of the present application and the systems described in the cited documents

The most remarkable difference in terms of configuration and function between the systems described in the documents (1) and (2) and the system according to claim 1 of the present application is that the system according to claim 1 of the present application is provided, as stated above, with "a map database storing, as map information, data on equipment in which a sensor is to be installed." The system is characterized in that, by linking a sensor attached to equipment to data on the equipment, the location where the sensor is installed is associated with the equipment. The contactless IC cards included in the systems described in the documents (1) and (2), in the first place, have no sensor for making measurements, so that there cannot be "values measured by an IC card" mentioned in your opinion. Therefore, "a sensor database which stores measurements collected by the sensor chip" according to the invention of

the present application is not included in the systems described in the documents (1) and (2), either. Thus, the system according to claim 1 of the present application clearly differs from the systems described in the documents (1) and (2).

Furthermore, the contactless IC cards included in the systems described in the documents (1) and (2) are provided with no battery. They can only communicate with a sensor (such a sensor is, in the field of information industry, generally called an interrogator or a reader/writer for a distinction from a sensor used to measure oscillation, temperature, humidity, etc.) only when the sensor (interrogator) is brought close to (within 13 cm of) them. Namely, when a sensor (interrogator) is brought close to a contactless IC card included in the systems described in the documents (1) and (2), data provided by a GIS or GPS system is contactlessly written to the contactless IC card. When the contactless IC card is attached to an information stake and the information stake is put in use, the data stored in the contactless IC card is read out contactlessly. As described above, the contactless IC cards included in the systems described in the documents (1) and (2) function only to retrieve and transmit positional data from and to a sensor (interrogator) when it is brought close to them. They have neither a sensor for measuring oscillation, temperature, humidity, etc. nor a function to constantly transmit measured data.

In addition, the invention is based on the recognition: "There

may be cases in which the available positioning accuracy is not high enough. In such cases, it is possible that a position considerably apart from where a sensor chip is installed is managed as a sensor chip position. Correcting such an error is troublesome." Based on this recognition, the invention is aimed at "providing, without requiring the mechanism of sensor chips to be changed, a means for saving the trouble of mapping sensor information on a map information system." In this respect, too, the system according to the invention differs from the systems described in the documents (1) and (2).

The systems described in the documents (1) and (2) also largely differ from the system according to the invention in terms of advantageous effects, too. For the systems described in the documents (1) and (2), "improvement in survey work efficiency" is mentioned as an advantageous effect (lines 15 to 18 on page 4 of the document (1)). The system according to the invention, on the other hand, associates a sensor chip (information stake) with relevant equipment information pre-registered in a GIS system based on results of a survey conducted in advance and thereby brings about an advantageous effect described as: "a sensor chip attached to equipment can be easily associated with equipment information prepared as map information" (lines 26 on page 18 to line 5 on page 19) without requiring a high-accuracy positioning system. Furthermore, the system according to the invention can collect all measurements produced by sensor chips,

which are installed at different locations in a region, and evaluate not only a representative location in the region but all of the locations in the region (lines 10 and 13 on page 8). In this respect, too, the system according to the invention basically differs from the systems described in the documents (1) and (2).

As described above, the documents (1) and (2) contain no disclosure or suggestion as to the invention of the present application, and we are convinced that claim 1 of the present application has novelty and nonobviousness.

5. You are kindly requested to understand the purport of the invention and re-examine it.

Thank you.